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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,415	08/25/2003	Michael E. Badding	SP03-110	4028

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CORNING INCORPORATED
SP-TI-3-1
CORNING, NY 14831

EXAMINER

CHU, HELEN OK

ART UNIT	PAPER NUMBER
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1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/648,415

Applicant(s)

BADDING ET AL.

Examiner

Helen O. Chu

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19, 24 and 25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 24, 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION

1. Applicants' Amendments filed on December 20, 2006 have been received.

Claims 1, 4, 9, 12-15 and 24 are amended.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/20/2006 has been entered.

Election/Restrictions

4. Applicant's reply filed on December 20, 2006 is acknowledged. The Applicants have amended their claims to incorporate claim 24 into the originally elected claims; therefore, claim 24 will be rejoined for examination.

Specification

5. The specification objection is withdrawn because Applicant's amended the claim.

Claim Rejections - 35 USC § 112

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6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. The rejections under 35 U.S.C 112, first paragraph, on claims 4, 12, 25 are withdrawn because Applicant has amended their claims.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-19, 24, 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation "close proximity" is unclear to the Examiner in claim 1. "Close proximity" can mean anywhere from touching to a couple of feet away. Revisions are required.

Claim Rejections - 35 USC § 102

10. The rejections under 35 U.S.C 102 (b), on claims 1-18, as anticipated by Quadakkers et al. are withdrawn.

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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12. Claims 1, 5, 7-9, 11, 13-19, 24 and 25 rejected under 35 U.S.C. 102(e) as being anticipated by Badding (US Publication 2003/0096147) as evidence by Pham et al. (US Publication 2002/0127460 A1)

In regard to claims 1, 5, 7-9, 11, 13-15, 19, 24, the Badding reference discloses a solid oxide fuel cell made of zirconia electrolyte and a stainless steel-cr containing (Paragraph 12) frame that supports oxide sheets and incorporate fuel/air supply (Abstract). Since there is no electrical activity in the frames, it is therefore electrically non-conducting. The Badding reference further discloses an oxidation resistant coating can be applied to the metal framing elements to reduce metal oxidation and/or fuel cell contamination in use. In particular, such coatings prevent chromium transport to the supported electrodes. Examples of such coatings are aluminum oxides (Paragraph 43). Since the aluminum oxide prevents chromium from transporting to the supporting electrodes, the surface of the electrodes will not have any chromium on the surface. As evidence by the Pham et al. reference, the oxidation resistant alloys often have a protective layer such as alumina which forms on the surface is insulating (non-electrically conductive), thus making the alloy unsuitable for interconnectors (Paragraph 5).

In regard to claims 16-18, the Badding reference discloses a the frame structure yields an average CTE of 11.5 ppm/°C (Paragraph 76).

In regards to claim 25, the Badding reference does not disclose a bipolar plate

Claim Rejections - 35 USC § 103

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13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 1-18, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable by Quadakkers et al (US Patent 5,733,682) as evidence by Pham et al. (US Publication 2002/0127460)

In regards to claims 1-6 and 8-12, 24, the Quadakkers reference discloses a solid oxide fuel cell with a zirconia-based electrolyte with an anode and a cathode situated on an electrolyte that function at operating temperatures of 950 °C (Column 1, Lines 17-23). The Quadakkers reference also discloses a passage where chromium based alloys migrates and deposited on the surface of the electrode forming chromium-oxides (Column 4, Lines 24-26). The reference further discloses an aluminum-enriched surface layer of 20-200 micrometers formed. The aluminum oxide layer causes protection and also interfacial contact resistance to the highly conductive contact surfaces of the bipolar plate and the electrode (Column 3, Lines 1-5; 7-12). At prefabricated steps of forming the aluminum oxide layer on the bipolar plate, the protective layer covers all of the bipolar plate which causes the entire region to be non-conductive. In addition, the second phase of production requires the aluminum layers of the contact surfaces to be removed and a layer of chromium oxide to be placed at the ribs; please note that the operating temperatures must be established at 950 °C.

However, as evidence by Pham et al. discloses that the interconnect surface conduction is enhanced by having chromium oxide layer, however at temperatures lower than 800 °C it proves to be ineffective (Paragraph 14-15). Therefore these bipolar plates are non-electrically conductive and are not in contact with the electrodes because of the coated layers on the bipolar plate.

In regards to claims 7, 13-15, the Quadakkers reference teaches a bipolar plate production in which the aluminum enriched layer is prefabricated and thereafter some of the aluminum surface is removed (Column 2, Lines 49-54. The Quadakkers reference teaches that the full surface of the bipolar plate is first covered with aluminum oxide, this teaches the entire surface was covered with aluminum oxide and that there did not exist a chromium or a chromium oxide layer at the prefabrication point of production.

In regard to claim 16-18, Quadakkers reference discloses that the thermal expansion coefficient of the electrolytes and electrodes are 10ppm/K and the bipolar plate should match the thermal expansion of the ceramic cell but does not disclose the range of 11-12ppm/K, however, since the amounts are so close that it is a prima facie obviousness that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

The Quadakkers et al. reference teaches that the bipolar plate is a load bearing structure (Column 1, Lines 39-41), which is one of the functions of a frame. In addition, the Quadakkers et al. reference discloses that the fuel cell can be a single cell (Column 1, Line 32); this would prevent the bipolar plate to be an electrical connector and would only function as a frame. Fuel cell stacks are interconnected by bipolar plate with an

anode of one cell in contact with one side of the bipolar plate and a cathode of a different cell in contact of the other side of a bipolar plate. Since the Quadakkers et al. reference indicates that the bipolar plate can be for a single cell that would prevent the plate to be an interconnector because there are no other cells in connection to the bipolar plate.

It is noted that claims 1 and 9, have "intended use" language and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987).

Response to Arguments

15. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

16. Applicant's arguments filed 12/20/2006 in reference to claim 9 have been fully considered but they are not persuasive.

a. *Applicant's arguments in reference to the "bipolar plate is not slender" and therefore cannot be a frame*

a. In response to this argument please consider the following:

Whether the bipolar plate is slender or not should not be the basis of the argument. The recitation "slender" is subjective and by the Figures provided by Quadakkers, the bipolar plate is slender in contrast to the electrode/electrolyte configuration or in contrast to a fuel cell assembly or a car with a fuel cell in it.

However, the Examiner provided a definition for a frame is to "cause major support" to the structure which is the equivalent to a load bearing component as described by Quadakkers reference to be a bipolar plate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen O. Chu whose telephone number is (571) 272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOC


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PRIMARY EXAMINER